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EXAMINER

LEBRON, JANNELLE M

ART UNIT PAPER NUMBER

2861

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Please find below and/or attached an Office communication concerning this application or proceeding.



## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

Claims 39 and 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims contain no structural limitations and the method limitations are given little patentable weight.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Hotomi et al. (US Patent 5,515,085).

3. Hotomi et al. discloses a droplet ejector comprising:

- Claim 1:

A fluid path through which a fluid moves (as seen in figure 14), a nozzle (23 in figure 14) being formed on one end of the fluid path;

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a volumetric structure (26 in figure 14) formed in the fluid path, the volumetric structure being sensitive to an external stimulus and being capable of varying in size to eject a droplet of the fluid through the nozzle (column 4, lines 33-40); and

a stimulus generator (31 and 32 in figure 14), which applies a stimulus to the volumetric structure to vary a size of the volumetric structure (column 6, lines 43-46), wherein the droplet ejector is configured to eject the droplet of fluid upon application of the stimulus (the electric field has to be first applied and then removed in order for the EVL to decrease and increase in size, causing the droplet to be ejected).

- Claim 2:

wherein the volumetric structure (26) expands in size to eject the droplet through the nozzle (23), and the stimulus generator (31 and 32) applies the stimulus to the volumetric structure to expand the size of the volumetric structure (column 4, lines 33-37; the stimulus has to be applied first in order for it to be removed and the volumetric structure has to decrease in size before expanding again and causing the droplet of fluid to be ejected).

- Claim 3:

wherein the volumetric structure (26) is formed of stimulus sensitive hydrogel (column 3, lines 10-16; as seen in figure 1).

- Claim 4:

wherein the stimulus sensitive hydrogel is electrical field sensitive hydrogel (column 4, lines 33-37).

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- Claim 5:

wherein the fluid path comprises:

a chamber, which is filled with the fluid to be ejected and is formed under the nozzle (as seen in figure 14); and

a channel for supplying the fluid to the chamber (column 6, lines 33-35),

wherein the volumetric structure (26) is formed in the chamber (as seen in figure 14).

- Claim 7:

wherein the stimulus generator is a pair of electrodes respectively disposed above and below the volumetric structure (column 6, lines 43-46).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 19-23 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hotomi et al (US Patent 5,515,085) in view of Torgerson et al (US 2003/0122895).

6. Hotomi et al. discloses an ink-jet printhead, comprising:

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- Claim 19:

a substrate on which a manifold (24 in figure 14) for supplying ink is formed;

a barrier layer (29 in figure 14), which is stacked on the substrate and on which an ink chamber to be filled with ink to be ejected and an ink channel for providing communication between the ink chamber and the manifold are formed (as seen in figure 14);

a volumetric structure (2 in figure 14), which is formed in a position where ink moves, the volumetric structure being sensitive to an external stimulus and being capable of varying in size to eject the ink droplet through the nozzle (column 4, lines 33-40); and

a stimulus generator (31 and 32 in figure 14), which applies a stimulus to the volumetric structure to vary a size of the volumetric structure (column 6, lines 43-46).

- Claim 20:

wherein the volumetric structure (26) expands in size to eject the ink droplet through the nozzle (23), and the stimulus generator (31 and 32) applies the stimulus to the volumetric structure to expand the size of the volumetric structure (column 4, lines 33-37).

- Claim 21:

wherein the volumetric structure (26) is formed of stimulus sensitive hydrogel (column 3, lines 10-16; as seen in figure 1).

- Claim 22:

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wherein the stimulus sensitive hydrogel is electrical field sensitive hydrogel (column 4, lines 33-37).

- Claim 23:

wherein the volumetric structure (26) is formed in the ink chamber (as seen in figure 14).

- Claim 25:

wherein the stimulus generator is a pair of electrodes respectively disposed above and below the volumetric structure (column 6, lines 43-46).

- Claim 26:

wherein one of the pair of electrodes is a cathode and is disposed above the volumetric structure (column 6, lines 46-49).

7. Hotomi et al. fails to teach:

- Claim 19:

a nozzle plate, which is stacked on the barrier layer and in which a nozzle, through which an ink droplet is ejected, is formed.

Torgerson et al. discloses an inkjet printhead (100 in fig. 3) comprising a nozzle plate (13 in fig.3) attached to the top of the ink barrier layer (12 in fig.13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Hotomi et al. invention to include a nozzle plate stacked on the barrier layer as taught by Torgerson et al. for the purpose of defining the ink chambers and ink openings in a way that improves the printing quality.

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***Allowable Subject Matter***

8. Claims 6, 8, 24 and 36-38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for allowance for these claims is the inclusion of the limitations of a droplet ejector:

- Claim 6 and 24:

wherein the volumetric structure has a columnar shape, a hexahedral shape, or a cylindrical shape.

- Claim 36:

wherein the volumetric structure exhibits a non-isotropic variation in size upon application of the stimulus.

- Claim 37:

wherein the volumetric structure is formed on a surface that defines a portion of the fluid path

It is these limitations, either alone or in combination as claimed that have not been taught, found, or suggested by prior art.

10. Claims 8 and 38 are allowable subject matter due to their dependency on allowable claims 36 and 37, respectively.



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***Response to Arguments***

Applicant's arguments with respect to claim 19 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jannelle M. Lebron whose telephone number is (571) 272-2729. The examiner can normally be reached on Monday thru Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on (571) 272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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